



# SGM4865

## 2.6W Stereo Audio Power Amplifier

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### GENERAL DESCRIPTION

The SGM4865 is a stereo audio power amplifier that is designed for demanding applications in mobile phones and other portable communication device applications. It is capable of delivering 2.6W of continuous average power per channel into a 4Ω load with typically 10% distortion (THD+N) from a 5V power supply.

The SGM4865 features an externally controlled, low power consumption shutdown mode and thermal shutdown protection. It also utilizes circuitry to reduce “pop/click” during device turn-on.

The SGM4865 is unity-gain stable and can be configured by external gain-setting resistors.

The SGM4865 is available in Green TQFN-4×4-16L package. It operates over an ambient temperature range of -40°C to +85°C.

### FEATURES

- **2.6W into 4Ω Load from 5V Supply at THD+N = 10% (Typical, per Channel)**
- **Excellent PSRR: Direct Connection to Battery**
- **Unity Gain Stable**
- **2.6V to 5.5V Operation**
- **Shutdown Current: 0.03μA (TYP)**
- **Improved Pop/Click Circuitry**
- **No Output Coupling Capacitors**
- **External Gain Configuration Capability**
- **Thermal Shutdown Protection Circuitry**
- **-40°C to +85°C Operating Temperature Range**
- **Available in Green TQFN-4×4-16L Package**

### APPLICATIONS

Cell Phones, PDA, MP4, PMP  
Portable and Desktop Computers  
Desktops Audio System  
Multimedia Monitors

**PACKAGE/ORDERING INFORMATION**

| MODEL   | ORDER NUMBER      | PACKAGE DESCRIPTION | PACKAGE OPTION      | MARKING INFORMATION |
|---------|-------------------|---------------------|---------------------|---------------------|
| SGM4865 | SGM4865YTQE16G/TR | TQFN-4×4-16L        | Tape and Reel, 3000 | SGM4865YTQE16       |

**ABSOLUTE MAXIMUM RATINGS**

|   |                                    |
|---|------------------------------------|
| Supply Voltage.....                               | 6V                                 |
| Input Voltage.....                                | -0.3V to (V <sub>CC</sub> ) + 0.3V |
| Storage Temperature Range.....                    | -65°C to +150°C                    |
| Junction Temperature.....                         | 150°C                              |
| Operating Temperature Range.....                  | -40°C to +85°C                     |
| Lead Temperature Range (Soldering 10sec)<br>..... | 260°C                              |
| ESD Susceptibility                                |                                    |
| HBM.....  | 4000V                              |
| MM.....   | 400V                               |

**NOTE:**

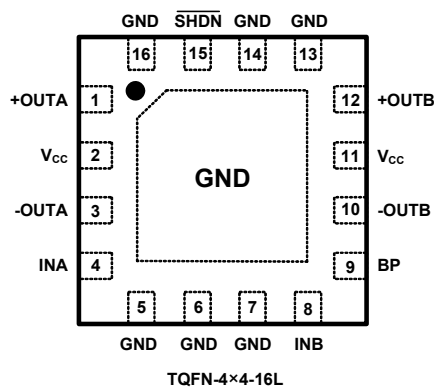
Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**CAUTION**

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

SGMICRO reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact SGMICRO sales office to get the latest datasheet.

**PIN CONFIGURATION (TOP VIEW)**



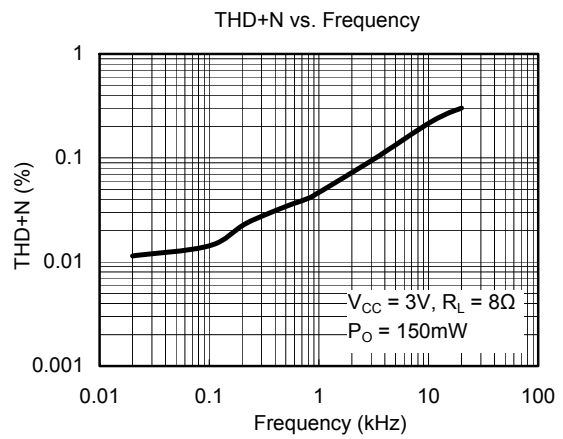
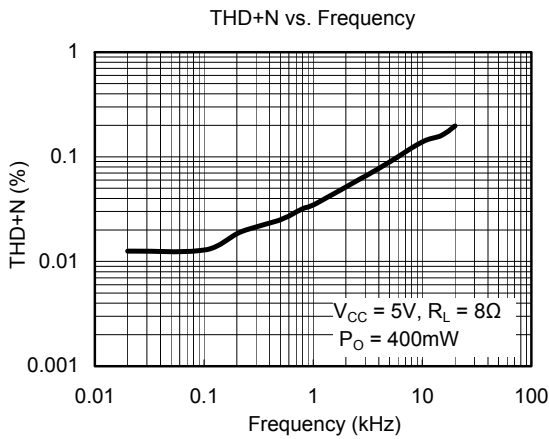
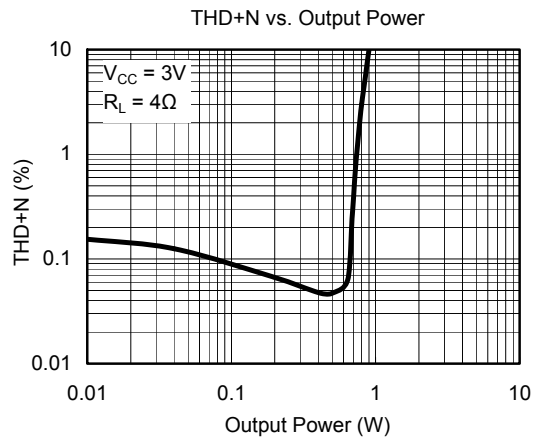
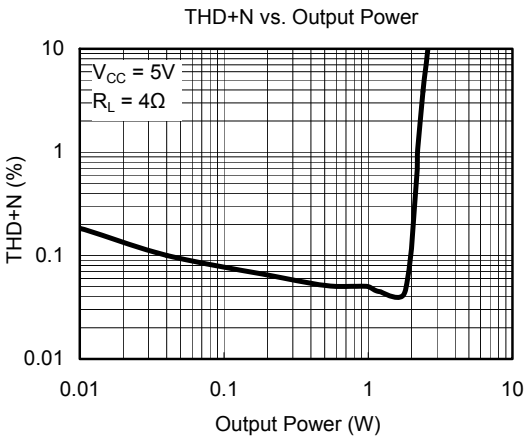
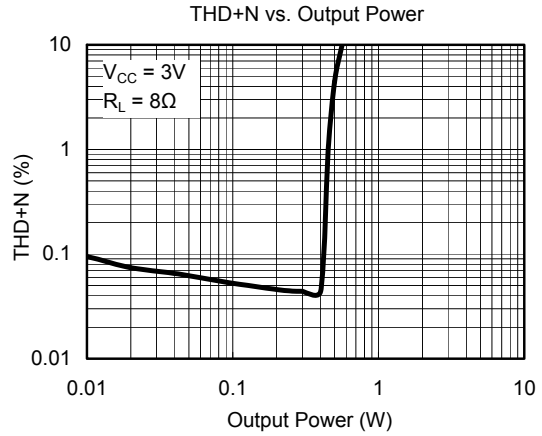
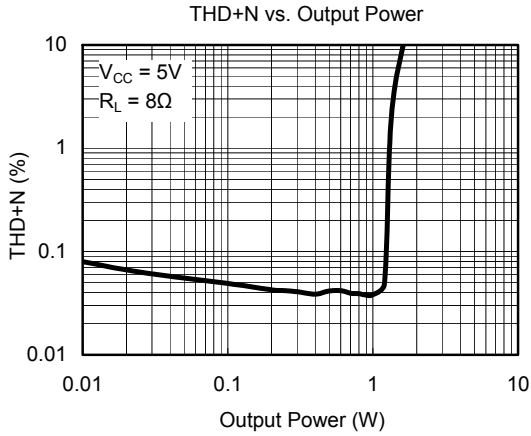
## ELECTRICAL CHARACTERISTICS

(T<sub>A</sub> = +25°C, unless otherwise specified.)

| PARAMETER                         | SYMBOL            | CONDITIONS  |                                 | MIN | TYP  | MAX  | UNITS |
|-----------------------------------|-------------------|---|---------------------------------|-----|------|------|-------|
| Supply Voltage                    | V <sub>CC</sub>   |   |                                 | 2.6 |      | 5.5  | V     |
| Quiescent Power Supply Current    | I <sub>Q</sub>    | V <sub>IN</sub> = 0V, I <sub>O</sub> = 0A,<br>V <sub>SHDN</sub> = V <sub>CC</sub> | V <sub>CC</sub> = 5V, No Load   |     | 6.40 |      | mA    |
|                                   |                   |   | V <sub>CC</sub> = 5V, 8Ω Load   |     | 7.00 | 10.5 |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V, No Load |     | 5.60 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V, 8Ω Load |     | 5.90 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 2.6V, No Load |     | 5.30 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 2.6V, 8Ω Load |     | 5.60 |      |       |
| Shutdown Current                  | I <sub>SD</sub>   | V <sub>IN</sub> = 0V, V <sub>SHDN</sub> = GND, V <sub>CC</sub> = 5.0V             |                                 |     | 0.03 | 4    | μA    |
|                                   |                   | V <sub>IN</sub> = 0V, V <sub>SHDN</sub> = GND, V <sub>CC</sub> = 3.0V             |                                 |     | 0.03 |      |       |
|                                   |                   | V <sub>IN</sub> = 0V, V <sub>SHDN</sub> = GND, V <sub>CC</sub> = 2.6V             |                                 |     | 0.03 |      |       |
| Shutdown Voltage Input High       | V <sub>SDIH</sub> |   |                                 | 1.2 |      |      | V     |
| Shutdown Voltage Input Low        | V <sub>SDIL</sub> |   |                                 |     |      | 0.4  |       |
| Output Offset Voltage             | V <sub>OS</sub>   | V <sub>IN</sub> = 0V, V <sub>SHDN</sub> = V <sub>CC</sub> = 5.0V                  |                                 | -25 | 8.00 | 25   | mV    |
|                                   |                   | V <sub>IN</sub> = 0V, V <sub>SHDN</sub> = V <sub>CC</sub> = 3.0V                  |                                 |     | 5.50 |      |       |
|                                   |                   | V <sub>IN</sub> = 0V, V <sub>SHDN</sub> = V <sub>CC</sub> = 2.6V                  |                                 |     | 5.00 |      |       |
| Output Power per Channel (8Ω)     | P <sub>O</sub>    | f = 1kHz, THD+N = 1%  | V <sub>CC</sub> = 5V            |     | 1.30 |      | W     |
|                                   |                   |   | V <sub>CC</sub> = 3.6V          |     | 0.70 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V          |     | 0.45 |      |       |
|                                   |                   | f = 1kHz, THD+N = 10%   | V <sub>CC</sub> = 5V            |     | 1.60 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.6V          |     | 0.85 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V          |     | 0.55 |      |       |
| Output Power per Channel (4Ω)     | P <sub>O</sub>    | f = 1kHz, THD+N = 1%  | V <sub>CC</sub> = 5V            |     | 2.10 |      | W     |
|                                   |                   |   | V <sub>CC</sub> = 3.6V          |     | 1.00 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V          |     | 0.70 |      |       |
|                                   |                   | f = 1kHz, THD+N = 10%   | V <sub>CC</sub> = 5V            |     | 2.60 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.6V          |     | 1.30 |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V          |     | 0.90 |      |       |
| Total Harmonic Distortion + Noise | THD+N             | V <sub>CC</sub> = 5V, R <sub>L</sub> = 8Ω, P <sub>O</sub> = 0.6W, f = 1kHz        |                                 |     | 0.04 |      | %     |
| Power Supply Rejection Ratio      | PSRR              | f = 217Hz, C <sub>B</sub> = 1μF,<br>Input grounded with 10Ω                       | V <sub>CC</sub> = 5V            |     | -70  |      | dB    |
|                                   |                   |   | V <sub>CC</sub> = 3.6V          |     | -70  |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V          |     | -70  |      |       |
|                                   |                   | f = 1kHz, C <sub>B</sub> = 1μF,<br>Input grounded with 10Ω                        | V <sub>CC</sub> = 5V            |     | -71  |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.6V          |     | -71  |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V          |     | -71  |      |       |
| Crosstalk                         | X <sub>TALK</sub> | V <sub>CC</sub> = 5V, P <sub>O</sub> = 1W, C <sub>B</sub> = 1μF                   |                                 |     | -90  |      | dB    |
| Turn-On Time                      | T <sub>ON</sub>   | C <sub>B</sub> = 1μF  | V <sub>CC</sub> = 5V            |     | 180  |      | ms    |
|                                   |                   |   | V <sub>CC</sub> = 3.6V          |     | 160  |      |       |
|                                   |                   |   | V <sub>CC</sub> = 3.0V          |     | 120  |      |       |

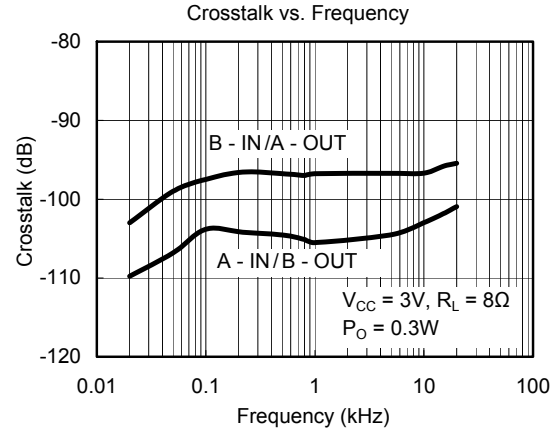
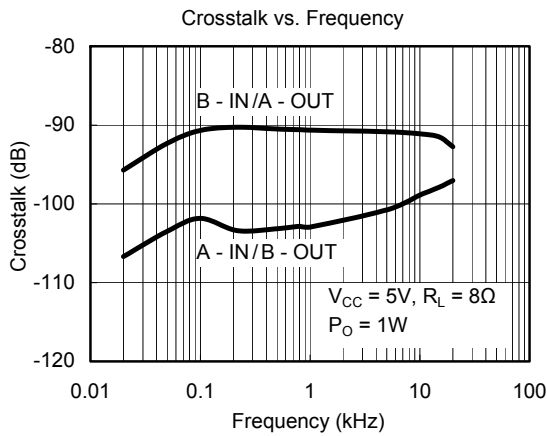
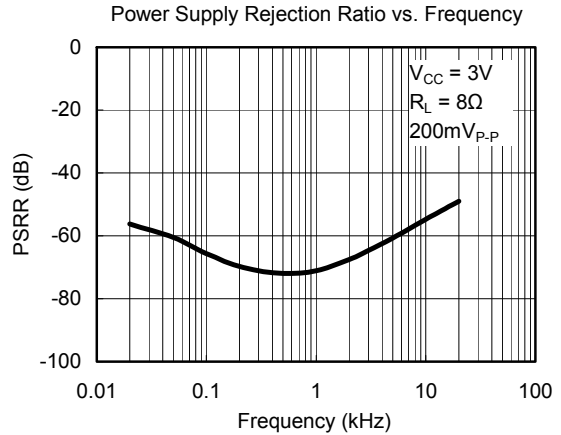
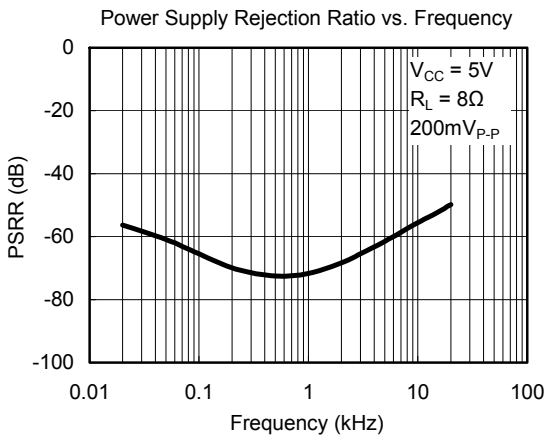
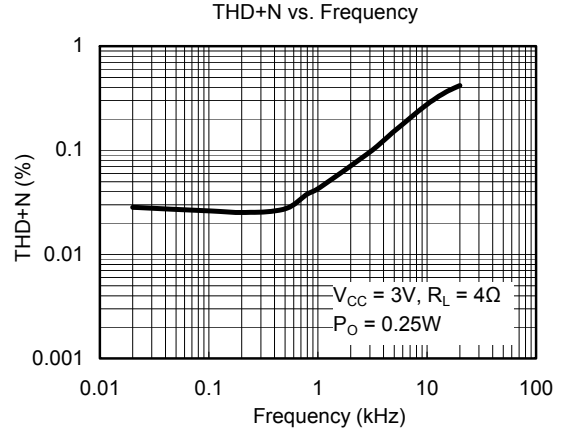
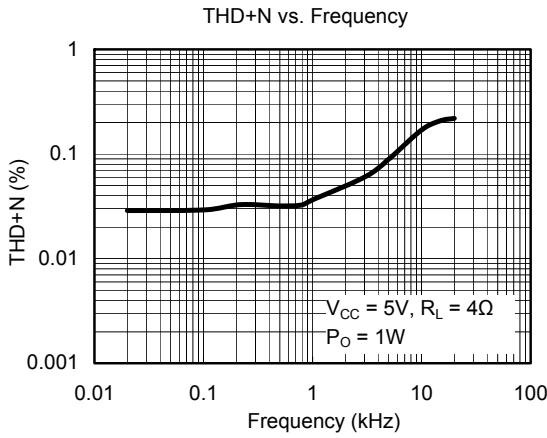
TYPICAL PERFORMANCE CHARACTERISTICS

At  $T_A = +25^\circ\text{C}$ ,  $A_V = 2$ ,  $f = 1\text{kHz}$ ,  $C_B = 1\mu\text{F}$ , unless otherwise noted.



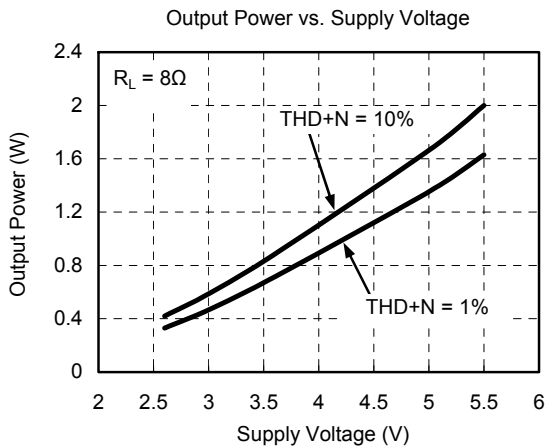
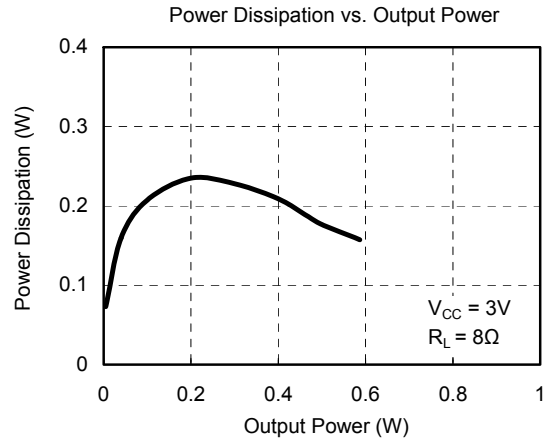
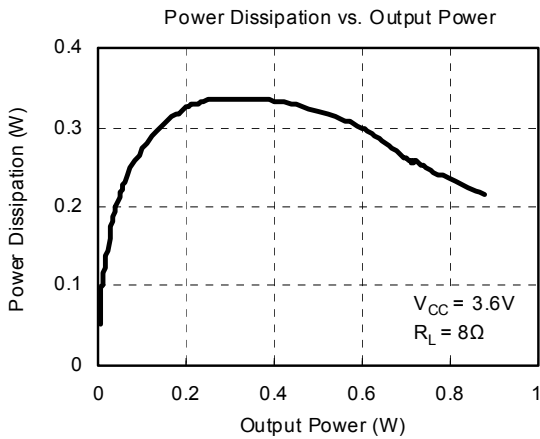
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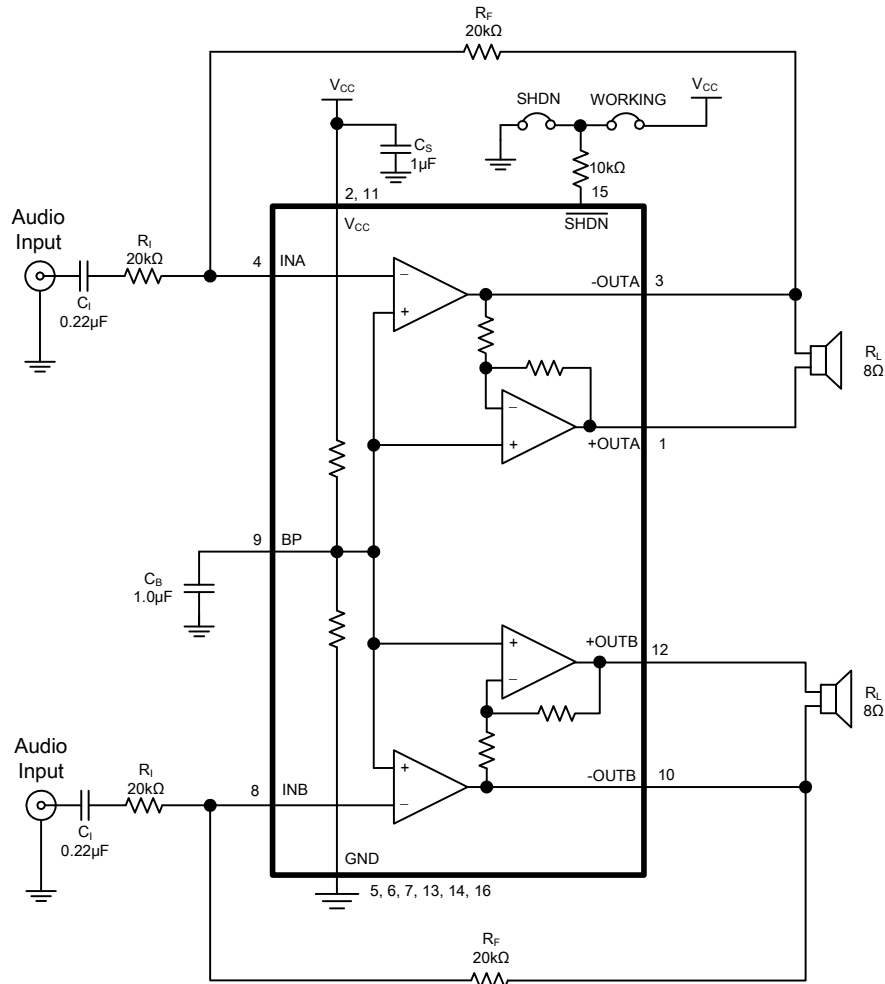


TYPICAL PERFORMANCE CHARACTERISTICS

At  $T_A = +25^\circ\text{C}$ ,  $A_V = 2$ ,  $f = 1\text{kHz}$ ,  $C_B = 1\mu\text{F}$ , unless otherwise noted.



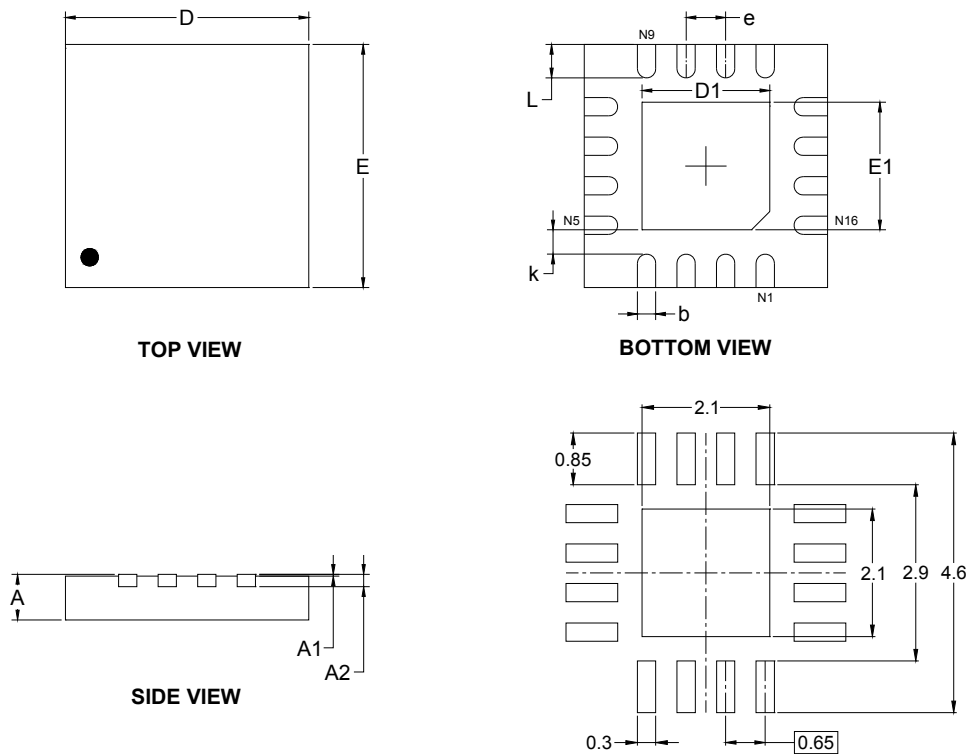
TYPICAL APPLICATION



NOTE:  
 1. A 10kΩ resistor must be serially connected to  $\overline{\text{SHDN}}$  pin.

PACKAGE OUTLINE DIMENSIONS

TQFN-4x4-16L



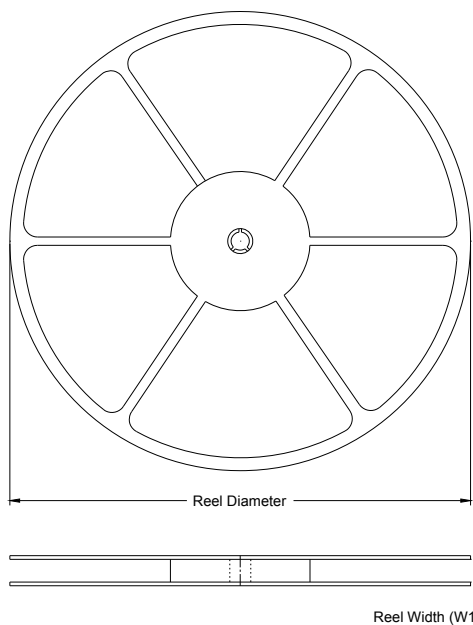
RECOMMENDED LAND PATTERN (Unit: mm)

| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | MIN                       | MAX   | MIN                  | MAX   |
| A      | 0.700                     | 0.800 | 0.028                | 0.031 |
| A1     | 0.000                     | 0.050 | 0.000                | 0.002 |
| A2     | 0.203 REF                 |       | 0.008 REF            |       |
| D      | 3.900                     | 4.100 | 0.154                | 0.161 |
| D1     | 2.000                     | 2.200 | 0.079                | 0.087 |
| E      | 3.900                     | 4.100 | 0.154                | 0.161 |
| E1     | 2.000                     | 2.200 | 0.079                | 0.087 |
| k      | 0.200 MIN                 |       | 0.008 MIN            |       |
| b      | 0.250                     | 0.350 | 0.010                | 0.014 |
| e      | 0.650 TYP                 |       | 0.026 TYP            |       |
| L      | 0.450                     | 0.650 | 0.018                | 0.026 |

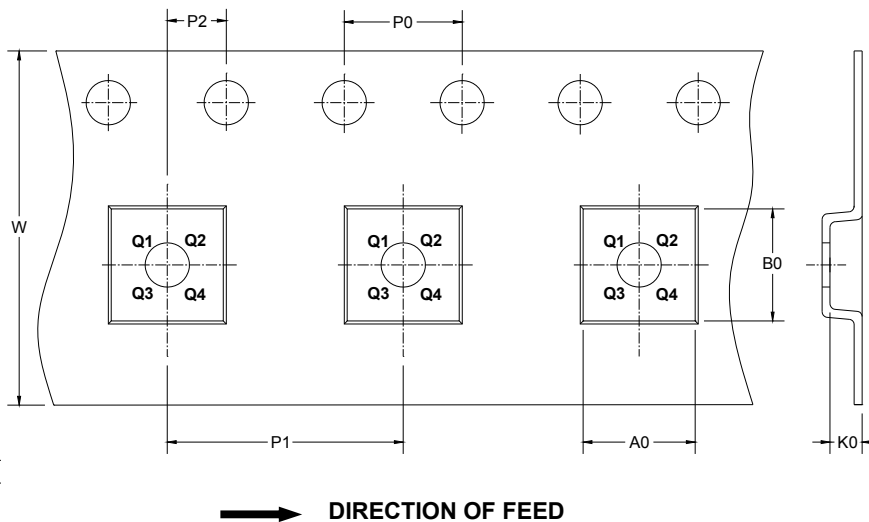


**TAPE AND REEL INFORMATION**

**REEL DIMENSIONS**



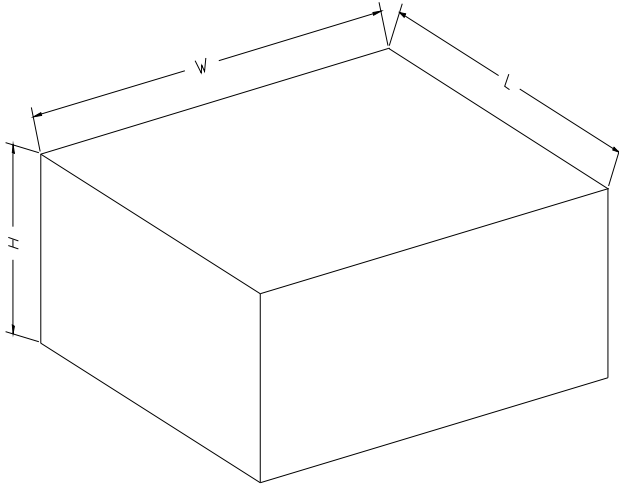
**TAPE DIMENSIONS**



NOTE: The picture is only for reference. Please make the object as the standard.

**KEY PARAMETER LIST OF TAPE AND REEL**

| Package Type | Reel Diameter | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|--------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| TQFN-4x4-16L | 13"           | 12.4               | 4.3     | 4.3     | 1.1     | 4.0     | 8.0     | 2.0     | 12.0   | Q1            |

**CARTON BOX DIMENSIONS**

NOTE: The picture is only for reference. Please make the object as the standard.

**KEY PARAMETER LIST OF CARTON BOX**

| Reel Type | Length (mm) | Width (mm) | Height (mm) | Pizza/Carton |
|-----------|-------------|------------|-------------|--------------|
| 13"       | 386         | 280        | 370         | 5            |